Magnetic Resonance Imaging: Accuracy and advantage in the staging and treatment of cervical cancer

Sonia Mathai [1], Aditi Chandra [2], Saugata Sen [2], Simi Agarwal [1], Asima Mukhopadhyay [1]
Department of Gynaecological Oncology [1] and Radiology [2], Tata Medical Center, Kolkata.

Introduction:

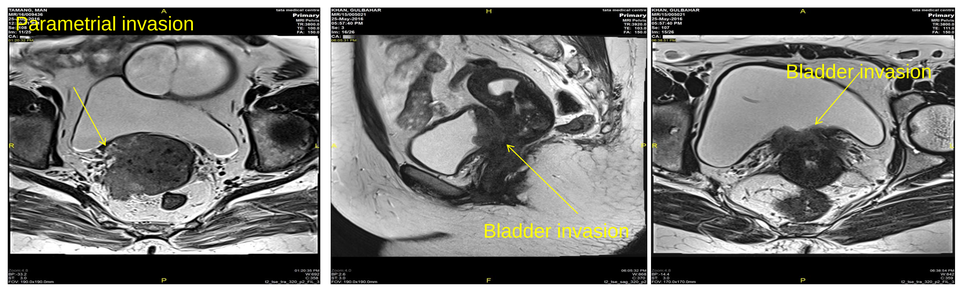
•FIGO pre-treatment clinical staging criteria using EUA and cystoscopy is recommended for treatment planning in cervical cancer.
•MRI is an important imaging modality in assessment of pelvic soft tissue involvement but has not been incorporated in FIGO staging.

Aims:

1) To assess the correlation of MRI with clinical FIGO staging and its ability to predict risk factors for adjuvant treatment in patients undergoing surgery.
2) Stratify endoscopic procedures in patients with suspected bladder/rectal invasion instead of routine EUA/Cystoscopy.
3) To assess whether MRI can replace EUA as a staging protocol and its cost implications in low resource settings.

Methods:

•Retrospective observational study
•Cervical cancer patients FIGO Stage IA-IVB treated between May 2011- May 2017 at Tata Medical Center, Kolkata.
•Clinical staging was performed on the basis of clinical examination without routine EUA and cystoscopy.
•All patients with MRI done at TMC were reviewed by Senor Radiologist



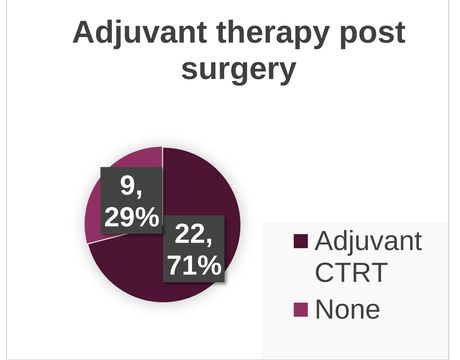
Results

Table 1. MRI correlation with clinical staging (no EUA)

FIGO Stage	N= 189	Same as to clinical stage		Downstaged		Upstaged		+ nodes on MRI
IA	01	0		0		1(100%)		0
IB1	31	22(70.9%)		0		9(29%)		5(16.1%)
IB2	11	10 (90.9%)		0		1(9.0%)		6 (50%)
IIA	27	0		16(59.2%)		11(40.7%)		8(29.6%)
IIB	119	84 (70.5%)		32 (26.8%)		3(2.5%)		47(39.4%)
IIIA	02	0	8.5%	01	60%	1	31.4%	18(51.4%)
IIIB	33	03		20		10		
IV	6	03(50%)		03(50%)		0		6(100%)

Table 2. MRI nodal prediction correlation with pathology

Pathology →	Nodes Positive	Nodes Negative	TOTAL
MRI NODE Positive	06	0	06
MRI NODE Negative	01	24	25
TOTAL	7	24	31
Sensitivity: 85.7%	Specificity: 100	PPV: 100%	NPV:96%



Summary:

- 70 patients (FIGO IA to IIA) were evaluated.
- MRI upstaged 1/1 in IA, 9/31 (29%) of IB1, 1/11 (9.0%) of IB2 and 11/27 (40.7%) of IIA patients.
- 15 women were upstaged to stage II – received CTRT as treatment
- 22/29 patients undergoing surgery based on clinical staging required adjuvant CTRT.
- 2 patients who were downstaged from IIB underwent surgery.
- In 31 patients, undergoing surgery, MRI had 85.7% sensitivity, 100% specificity, 100 %PPV and 96% NPV for predicting pathological nodal involvement.

Fig 2. Change in management Stage I-II after MRI imaging

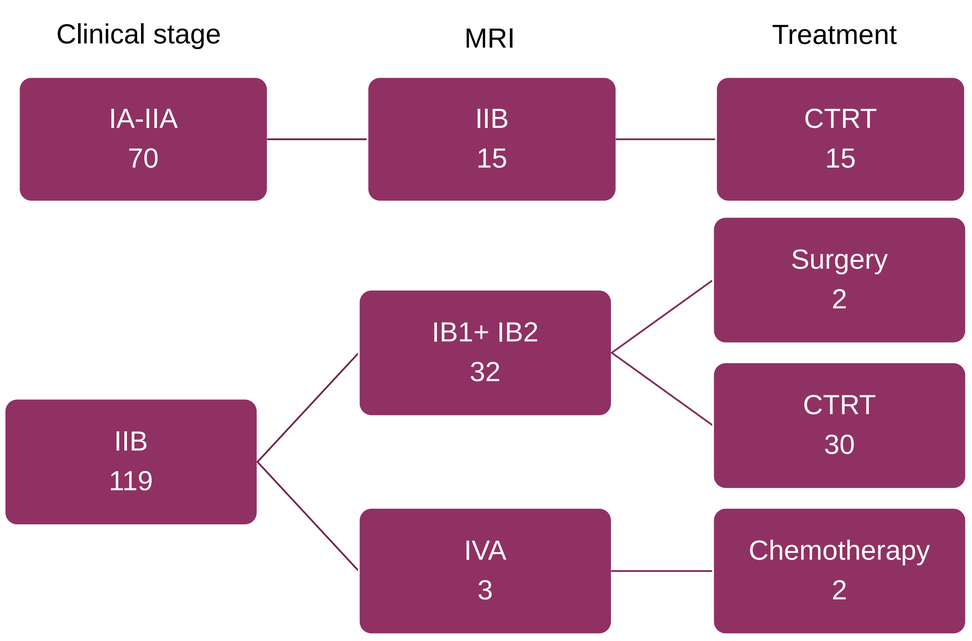


Fig 3. MRI imaging impacting staging III-IV and change in management

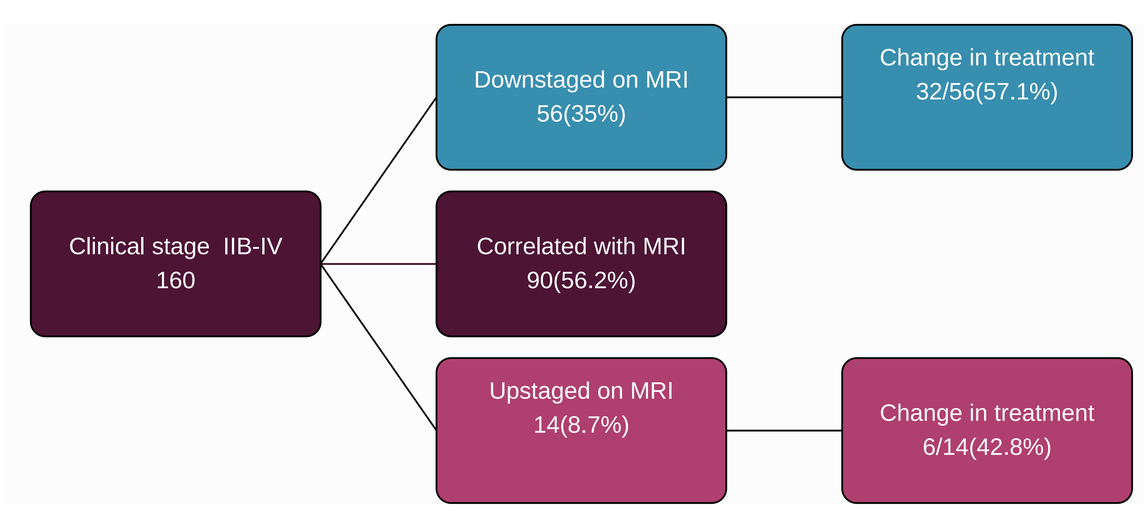
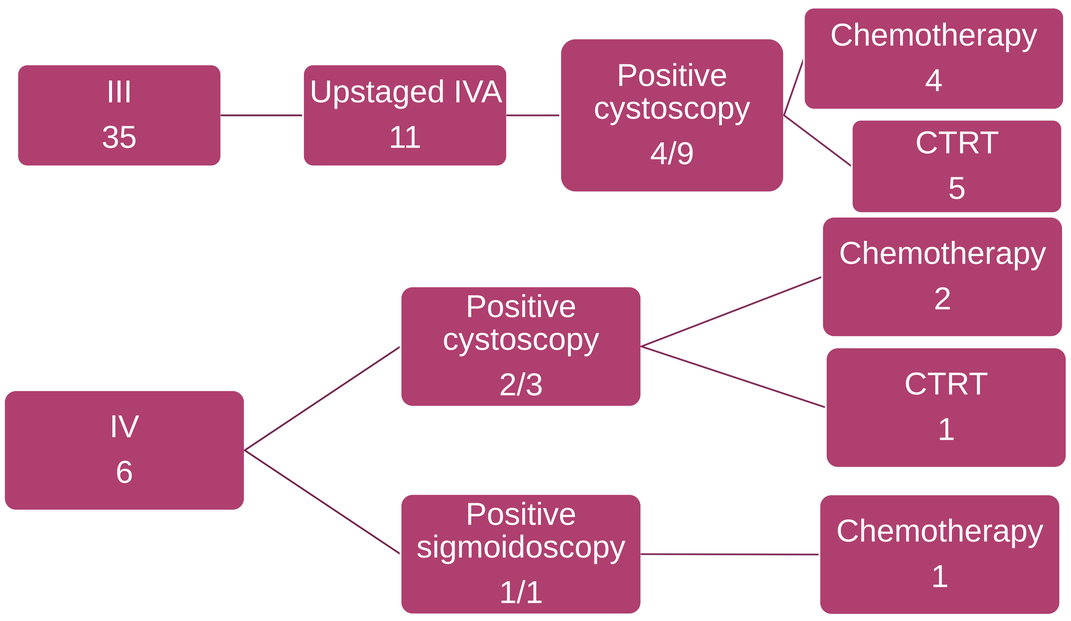


Fig 4.Change in management after endoscopic procedures



Impact on resources MRI vs. EUA & Endoscopy
•EUA + Endoscopy cost : Rs 25,000
(Pre anaesthetic check-up, EUA & Cystoscopy and OPD visits)
•MRI cost : Rs 7,000
•For 160 patients the estimated total cost saving is 17 lakhs if MRI is used to stratify EUA /Cystoscopy

Endoscopic procedures after MRI imaging

Cystoscopy indicated	**16/160 (10%)**
Positive cystoscopy	7/16 (43.7%)
Sigmoidoscopy indicated	**2/160 (1.2%)**
Positive sigmoidoscopy	1/2 (50%)

Clinical Stage	Cystoscopy	Sigmoidoscopy
IIB (n=120)	**2**	**1**
positive	1	0
negative	1	1
not done	0	0
III (n=36)	**11**	0
positive	4	0
negative	5	0
not done	2	0
IV (n=6)	3	1
positive	2	1
negative	1	0

Conclusions:

- MRI is a resource effective modality which can replace EUA as a staging procedure.
- A significant proportion of early stage patients are upstaged on MRI with good pathological correlation. It can be a useful predictor for adjuvant therapy and avoiding dual treatment modalities.
- In a significant proportion of cases MRI lead to a change in clinical staging (108/189, 57.1%) thereby impacting the prognosis of the disease and change in treatment plan (53/189,28%).
- MRI imaging by an experienced radiologist can be an important determinant in staging ,prognosticating and determining need for endoscopic procedures in the treatment of cervical cancer thereby eliminating the need for routine EUA and cystoscopy

Correspondence: asima.mukhopadhyay@tmckolkata.com